

## On possibility of using of measurements of random polarization of radio reflections from meteor trails for generating shared encryption keys

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### Abstract

© 2017 IEEE. Meteor burst channel is formed by a scattering of radio waves from the ionized trails left by fast meteor particles. Meteor phenomena make the channel to be stochastic. Using this randomness along with approximate reciprocity of radio propagation, two communication points are able to generate a purely random shared encryption key by joint observation on the channel parameters. In previous studies, it was shown that the randomness of carrier phase and propagation time of detected meteor radio reflections can be used for the key generation purposes. However, a polarization of the radio reflections is also random, and it might be used to generate the keys too. In this study, the first ever attempt on examining a possibility of generating of purely random encryption keys using the samples of random polarization of meteor radio reflections is made. By computer simulation based on a rigorous solution to the problem of oblique diffraction of radio waves on meteor trails, statistical properties of the polarization of meteor radio reflections are studied. The estimates of the cross-correlation between the values of polarization measured synchronously at both sides of a radio link and differing due to non-perfect reciprocity of meteor burst channel are presented. Some preliminary results on the testing generation of a random key are also presented in the end of the paper.

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### Keywords

Diffraction of radio waves, Encryption key, Meteor burst propagation, Meteor radio reflection, Polarization

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